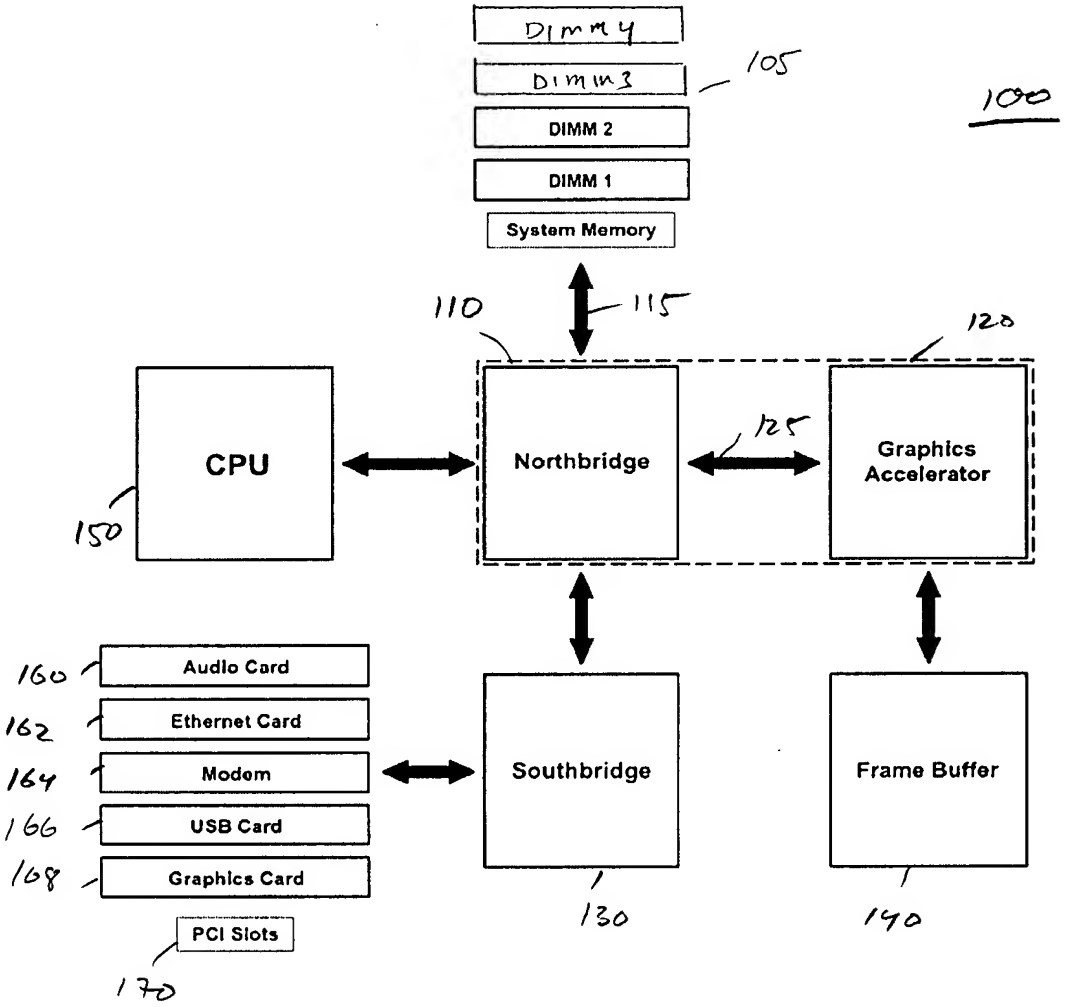
DIMM 4
DIMM 3
DIMM 2
DIMM 1
System Memory
105
100
110
115
120
CPU
150
Northbridge
125
Graphics Accelerator
160
Audio Card
162
Ethernet Card
164
Modem
166
USB Card
168
Graphics Card
PCI Slots
170
Southbridge
130
Frame Buffer
140

FIGURE 1

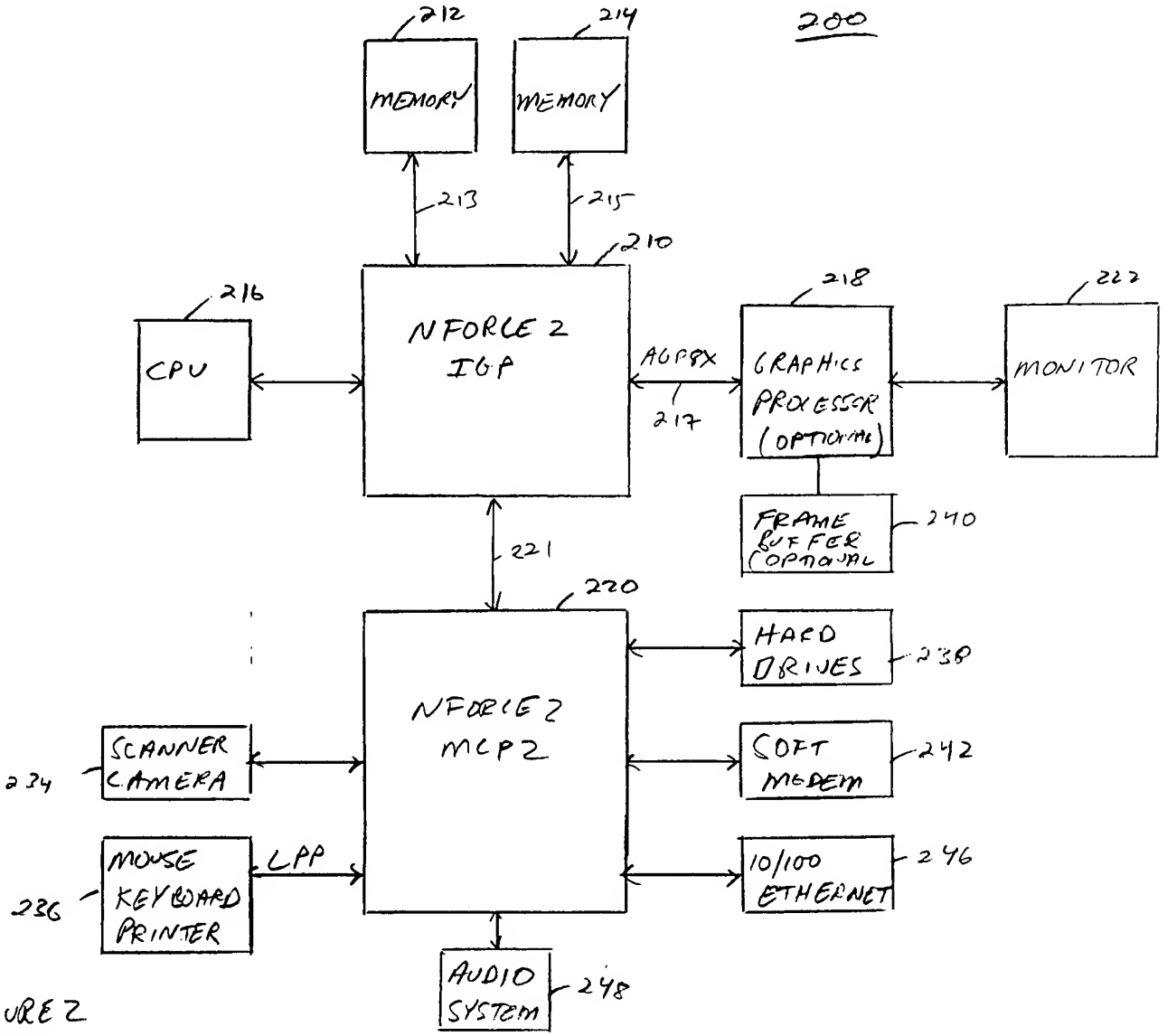
200
212
MEMORY
214
MEMORY
213
215
210
216
CPU
NFORCE 2
IGP
AGP8X
217
218
GRAPHICS
PROCESSOR
(OPTIONAL)
222
MONITOR
FRAME
BUFFER
(OPTIONAL)
240
221
220
NFORCE 2
MCP2
HARD
DRIVES
238
SCANNER
CAMERA
234
SOFT
MODEM
242
MOUSE
KEYBOARD
PRINTER
236
LPP
10/100
ETHERNET
246
AUDIO
SYSTEM
248

Figure 2

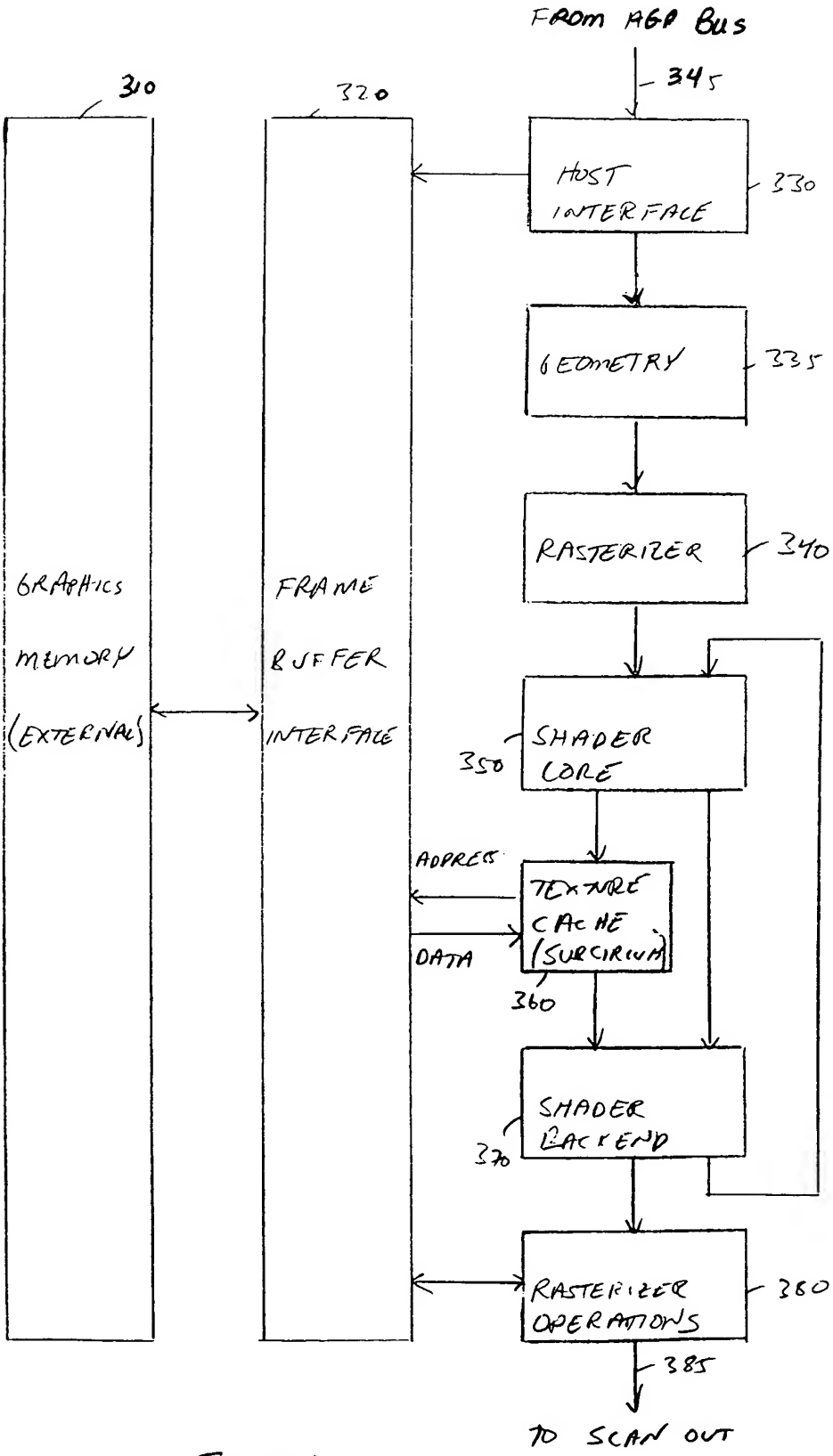
FROM AGP Bus
345
310
320
HOST INTERFACE
330
GEOMETRY
335
RASTERIZER
340
GRAPHICS MEMORY (EXTERNAL)
FRAME BUFFER INTERFACE
SHADER CORE
350
ADDRESS
DATA
TEXTURE CACHE (SURFACE)
360
SHADER BACKEND
370
RASTERIZER OPERATIONS
380
385
TO SCAN OUT

FIGURE 3

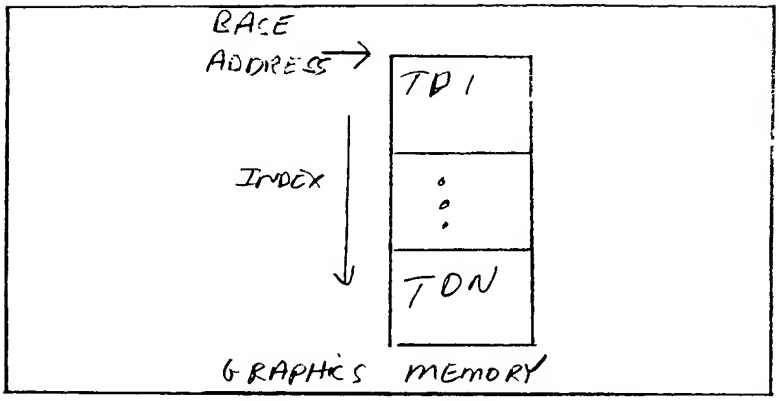

FIGURE 4A

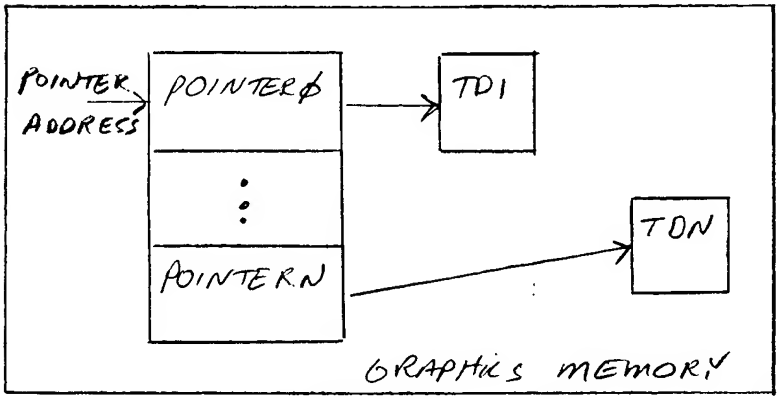

FIGURE 4B

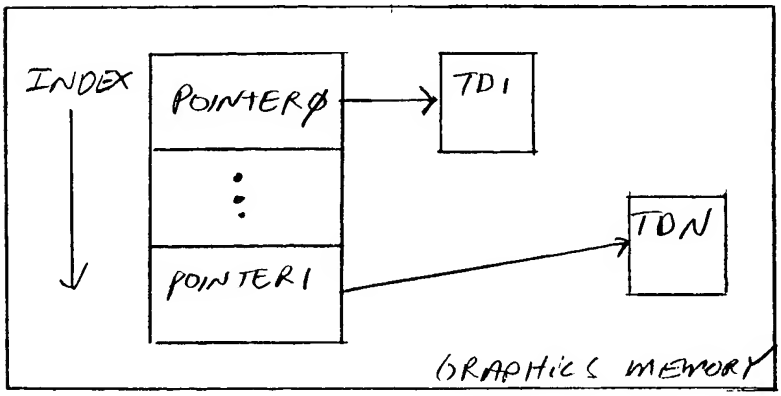

FIGURE 4C

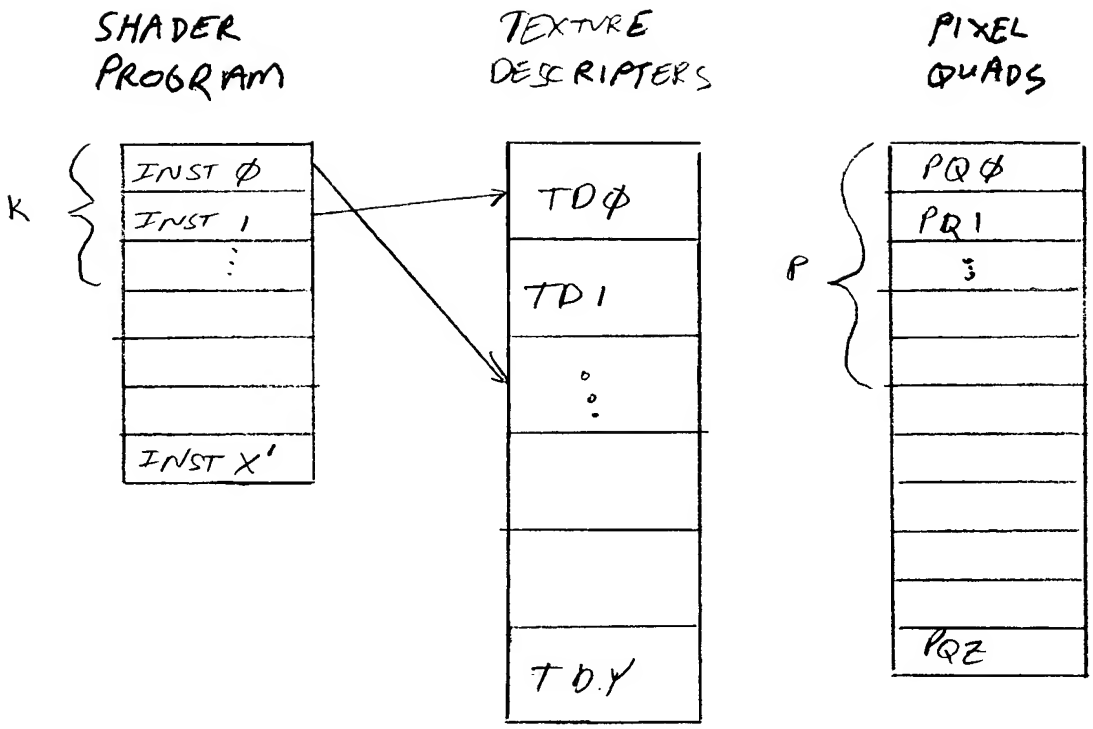
SHADER PROGRAM
TEXTURE DESCRIPTERS
PIXEL QUADS
K
INST Ø
INST 1
INST X'
TDØ
TD1
TD.Y
P
PQØ
PQ1
PQZ

FIGURE 5

600

610 INSTRUCTION NUMBER	INSTRUCTION	
1	TEX R0, #102	— 620
2	TEX R1, #103	- 630
3	ADD R2, R0, R1	- 640
4	TEX R0, #104	
5	TEX R1, #105	
6	ADD R2, R2, R0	
7	ADD R2, R2, R1	
8	TEX R0, #106	
9	TEX R1, #107	
10	ADD R2, R2, R0	
11	ADD R2, R2, R1	
12	TEX R0, #108	
13	TEX R1, #109	
14	ADD R2, R2, R0	
15	ADD R2, R2, R1	
16	OUT R2	—650

FIGURE 6

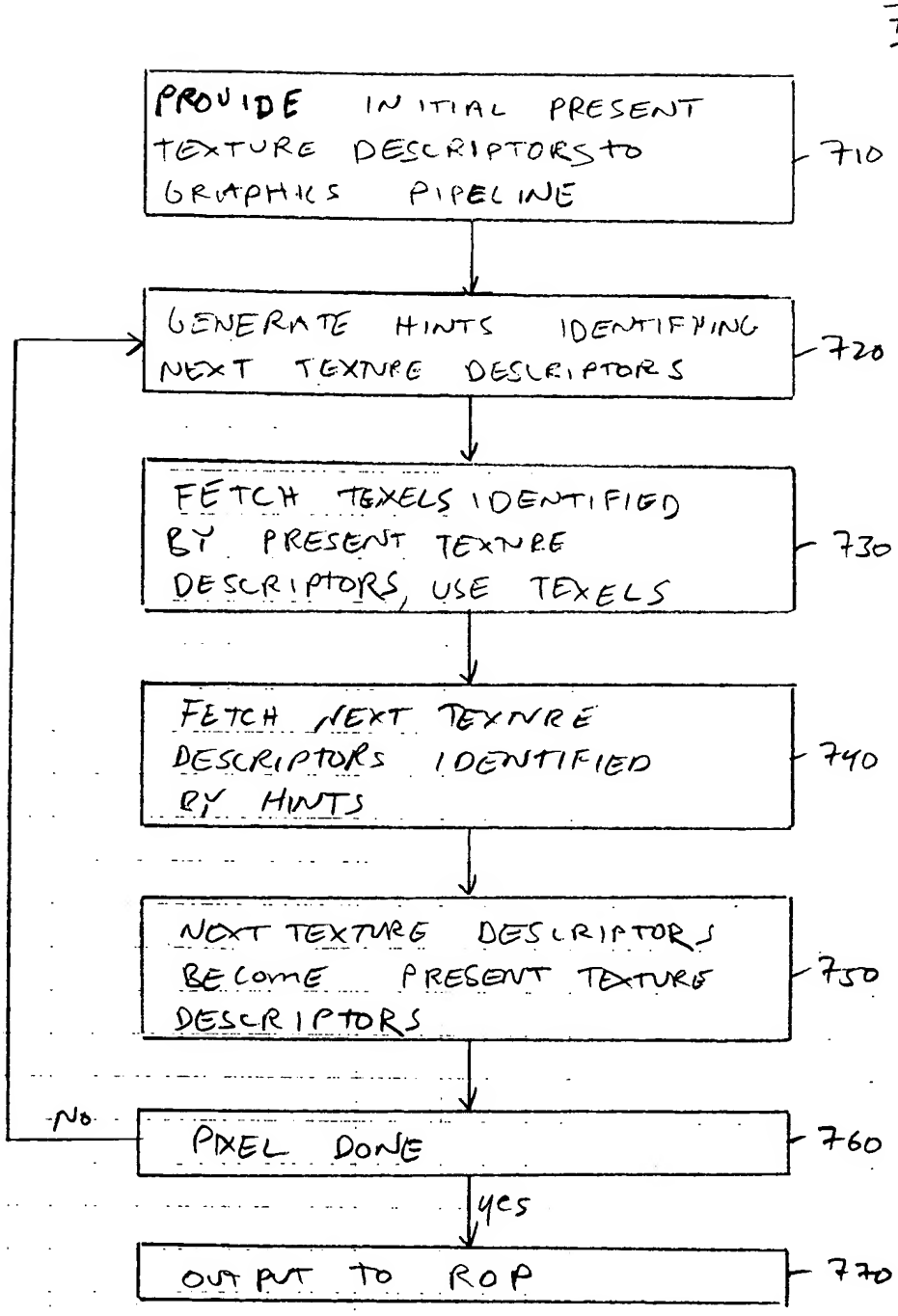
700
PROVIDE INITIAL PRESENT TEXTURE DESCRIPTORS TO GRAPHICS PIPELINE
710
GENERATE HINTS IDENTIFYING NEXT TEXTURE DESCRIPTORS
720
FETCH TEXELS IDENTIFIED BY PRESENT TEXTURE DESCRIPTORS, USE TEXELS
730
FETCH NEXT TEXTURE DESCRIPTORS IDENTIFIED BY HINTS
740
NEXT TEXTURE DESCRIPTORS BECOME PRESENT TEXTURE DESCRIPTORS
750
No
PIXEL DONE
760
yes
OUTPUT TO ROP
770

Figure 7

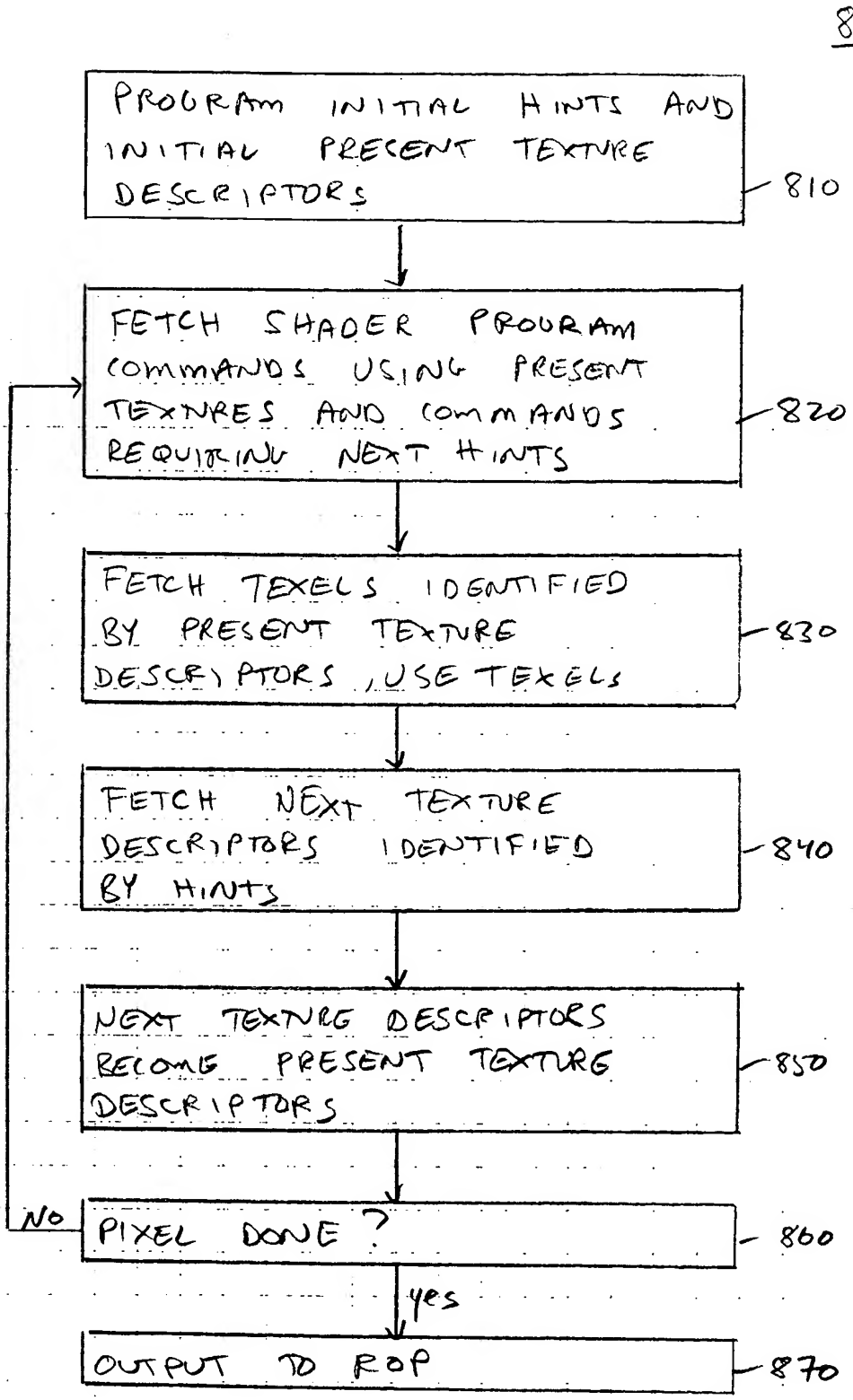
800
PROGRAM INITIAL HINTS AND INITIAL PRESENT TEXTURE DESCRIPTORS
810
FETCH SHADER PROGRAM COMMANDS USING PRESENT TEXTURES AND COMMANDS REQUIRING NEXT HINTS
820
FETCH TEXELS IDENTIFIED BY PRESENT TEXTURE DESCRIPTORS, USE TEXELS
830
FETCH NEXT TEXTURE DESCRIPTORS IDENTIFIED BY HINTS
840
NEXT TEXTURE DESCRIPTORS BECOME PRESENT TEXTURE DESCRIPTORS
850
NO
PIXEL DONE ?
860
yes
OUTPUT TO ROP
870

FIGURE 8

900

910 ACTIVITY	920 INSTRUCTION FETCH	930 INSTRUCTION USED	940 TEXTURE HINT AND TEXTURE DESCRIPTION FETCH	950 TEXEL FETCH USING TEXTURE DESCRIPTOR	960 TEXEL USED	
PREFETCH	1-2 3-5	None	104, 105	102, 103	None	965
PASS 1	6, 7 8-11	1-3	106, 107	104, 105	102, 103	970
PASS 2	12-16	4-7	108, 109	106, 107	104, 105	975
PASS 3	None	8-11	No Op	108, 109	106, 107	980
PASS 4	None	12-16	No Op	No Op	108, 109	985

FIGURE 9

1000

	1010 REG 1	1012 REG 2	1014 REG 3	1016 REG 4	1018 REG 5	1020 REG 6
	INITIAL1	INITIAL2	NEXT 1	NEXT 2	PRESENT 1	PRESENT 2
1030	102	103	104	105	X	X
			PRESENT1	PRESENT2	NEXT 1	NEXT 2
1040			104	105	106	107
			NEXT 1	NEXT 2	PRESENT 1	PRESENT 2
1050			108	109	106	107
			PRESENT1	PRESENT2	NEXT 1	NEXT 2
1060			108	109	X	X
			NEXT 1	NEXT 2	PRESENT 1	PRESENT 2
1070			104	105	X	X

FIGURE 10

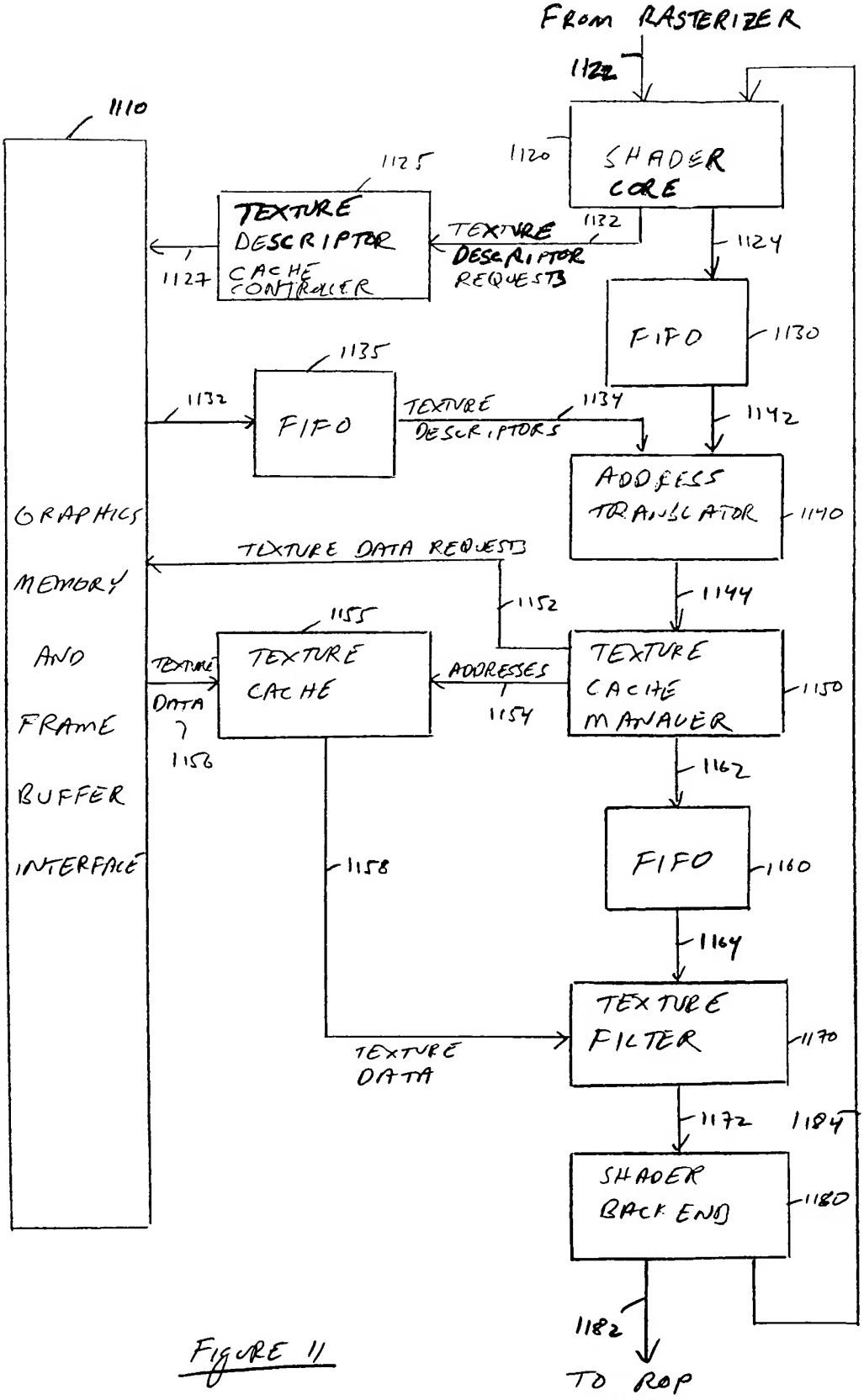
FROM RASTERIZER
1122
1110
1120
SHADER CORE
1125
TEXTURE DESCRIPTOR CACHE CONTROLLER
1127
TEXTURE DESCRIPTOR REQUESTS
1122
1124
FIFO
1130
1135
1132
FIFO
TEXTURE DESCRIPTORS
1134
1142
ADDRESS TRANSLATOR
1140
GRAPHICS MEMORY AND FRAME BUFFER INTERFACE
TEXTURE DATA REQUESTS
1152
1144
1155
TEXTURE CACHE
TEXTURE DATA
1156
ADDRESSES
1154
TEXTURE CACHE MANAGER
1150
1162
1158
FIFO
1160
1164
TEXTURE FILTER
1170
TEXTURE DATA
1172
1184
SHADER BACK END
1180
1182
TO ROP

FIGURE 11